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Docket No. H0001537

REMARKS

Claims 1-22 are pending in this application.

Claim 22 has been withdrawn as directed to a non-elected invention.

Claims 1-21 are rejected.

The examiner is thanked for withdrawing the restriction of claims 19-21.

Although the restriction of claim 22 was maintained, the applicants respectfully reserve the right to file one or more applications on non-elected claim 22.

In paragraph 3 of the office action, the drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) (reference numeral 210 was not indicated in Figure 3). This objection has been overcome by deleting reference numeral 210 on the paragraph on page 7 of the application.

In paragraph 5, the examiner raises objections to several minor errors in the specification. These objections have been overcome by the amendments to pages 1, 5 and 6 of the specification.

In paragraph 7, the examiner raises objections to claims 14 and 17. These objections have been overcome by the amendments above to claims 14 and 17.

In paragraph 9, the examiner rejects claims 9, 12 and 18 under 35 U.S.C. 112, second paragraph, as being indefinite. The rejection of claim 9 has been rendered moot by the cancellation of claim 9. Although claims 12 and 18 have been amended, the '112 rejections of claims 12 and 18 are respectfully traversed, since it is permissible for a method claim to depend from a non-method claim. Claim 12 recites a method of using a system. Details of the system are recited in claim 1. Claim 18, it recites a method of using an NOx filter. Details of the NOx filter are recited in claim 15. Because these claims comply with the second paragraph of 35 U.S.C. 112, the '112 rejection of claims 12 and 18 should be withdrawn.

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In paragraphs 10-18 of the office action, claims 1, 15 and 19 are rejected under at least one of 35 U.S.C. sections 102 and 103. These '102 and '103 rejections have been rendered moot by the amendments above to claims 1, 15 and 19.

Amended claim 1 recites a system comprising a source of gas, the gas including NO_x; and material for filtering the gas. The filter material includes a catalyst for converting the NO_x to NO₂, and an alkali for adsorbing the NO₂ without desorption.

The cited documents (Cole, Stiles, Suzuki and Zensuke) do not teach or suggest such filtering. According to the cited documents, the oxidation state of the NO_x is changed, for example when the oxygen is removed from NO_x to convert NO_x to diatomic nitrogen (N₂) using hydrogen, ammonia, or other reducing agent, and specialized reduction catalysts. This is what Cole means by three-way catalyst or catalytic converter and Stiles means by reduction. Both filters involve a first step of adsorbing the NO_x on a bed, a second step of desorbing by high temperature, and a third step of passing the desorbed NO_x over a conversion catalyst with hydrogen, ammonia, hydrocarbons, or other reducing gas to convert NO_x to N₂.

Suzuki is no more relevant than Stiles and Cole. Suzuki discloses a three-catalyst system. The first catalyst utilizes a noble metal catalyst porous acidic support; the second is an NO_x absorber (with or without a noble metal) of alkali, alkaline earth or rare earth metals; and the third catalyst utilizes noble metal on a porous support.

Claim 15 has been amended to recite first and second support structures that are spaced apart and that allow a catalysts and an alkali to be used in different environments, such as different pressures, temperatures, humidities, etc. (see e.g., pages 7-8 of the present specification, which discloses that the catalyst may be operated at temperatures of 200°C-450°C while the alkali is independently operated in the range of 0°C-350°C). The ability to independently operate the catalyst and the alkali allows the catalyst and alkali to be optimized.

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The NOx filter of claim 15 is not taught or suggested by the cited documents. Stiles discloses a "catalyst-adsorber" which is essentially manganese and aluminum oxides coated with an alkali. There is no separation between the catalyst and the adsorber.

Suzuki discloses a three-catalyst system in which none of the catalyst structures are separated. The first catalyst utilizes a noble metal catalyst porous acidic support; the second is an NOx absorber (with or without a noble metal) of alkali, alkaline earth or rare earth metals; and the third catalyst utilizes noble metal on a porous support. There is not teaching of suggestion of separating the layers so that they can be independently optimized.

Cole discloses an NOx filter in which an adsorbent is in front of and adjacent to a three-way catalyst. The catalyst utilizes a reductant gas to convert NOx to molecular nitrogen (unlike the catalyst of claim 15, which converts NOx to NO₂). Moreover, Cole does not teach or suggest that the catalyst and alkali are independently optimizable.

According to paragraph 14 of the office action, Cole teaches first and second, spaced-apart supports for a catalyst and an alkali absorbent. From this, the office concludes that the catalyst and alkali are "inherently independently optimized" In fact, there is no showing in Cole to support this conclusion, and the examiner does not explain why she believes this limitation to be inherent. Cole does not appear to appreciate the benefits of independent optimization. Conventional catalyst and absorber assemblies do not suggest the need for, much less the benefit of, separately optimizable filter components. If the benefits of such independent operation was appreciated by Cole, why does Cole not suggest such a system?

For these reasons, claim 15 should be allowed over the documents made of record. Claims 16-18 should also be allowable, as they depend from amended claim 15.

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Amended claim 19 recites a split layer PTF including a catalyst integrated with a CATOX and an alkali downstream from the catalyst. The catalyst oxidizes the NO_x to NO₂, and the alkali adsorbs the NO₂ without desorption. As indicated above, Cole does not teach or suggest such a catalyst/alkali combination.

In paragraphs 15-18 of the office action, claim 20 is rejected under 35 U.S.C. §103 as being unpatentable over Cole. This rejection is respectfully traversed.

Claim 20 recites an environmental control system comprising a CATOX; an air conditioning system (ACS) downstream from the CATOX; and a post treatment filter downstream from the CATOX, the filter including a catalyst and alkali.

Cole does not teach or suggest an air conditioning system. Moreover, Cole does not teach or suggest interposing any element between a CATOX and a post treatment filter. Cole simply shows an engine, and a single canister downstream the engine. The single canister includes a filter. Because Cole alone does not teach or suggest the system of claim 20, the '103 rejection of claim 20 and its dependent claim 21 should be withdrawn.

The office action cites laws regarding "mere rearrangements" as being obvious. However, the office action has yet to cite a document showing an arrangement that includes an air conditioning system, a catalyst and an alkali. Therefore, it is premature to make arguments about rearrangements, let alone "mere" rearrangements. Moreover, the office action doesn't explain why claim 20 is a "mere" rearrangement as opposed to any other type of rearrangement. Any arrangement of known parts can be characterized as a rearrangement. The issue is whether the cited documents suggest the arrangement.

In short, the office action has not yet established prima facie obviousness of claim 20. And it certainly has not established prima facie obviousness of claim 21, which recites an air conditioning system between the catalyst and alkali.

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In paragraph 17, the office action contends that "economics" is a motivating factor for separating the CATOX from the post treatment filter, and the alkali from the catalyst. However, the office action provides no documents to support this contention.

In paragraph 18, the office action makes a number of other factual allegations, but does not cite any documents that support the allegations. It is therefore presumed that these factual allegations are within the personal knowledge of the examiner. Pursuant to MPEP §707 and 37 CFR §1.104(d)(2), the examiner is respectfully requested to provide an affidavit supporting her personal knowledge.

It is respectfully submitted that the present application is in condition for allowance. The examiner is invited to contact the undersigned to discuss any issues that remain in the application.